Observation.	Daily quantity of urine in c.c.	Specific gravity.	Per cent. sugar.	Total quantity sugar per day (grams).
1. Unlimited diet	3400	1038	4.2	143
2. Diabetic diet	2300	1032	3.4	79
3. Diabetic diet + soy beans	2100	1024	1.9	40

CONCLUSIONS. (1) The soy bean is a valuable addition to the dietary of the diabetic on account of its palatability, and the numerous ways in which it can be prepared. (2) The soy bean in some way causes a reduction in the percentage and total quantity of sugar passed in diabetic subjects on the usual dietary restrictions.

THE ROLE PLAYED IN AUSCULTATORY SIGNS OF THE RESPIRATORY SYSTEM BY THE SOUND-CONDUCTING PROPERTY OF THE BONY FRAMEWORK OF THE THORAX.

BY JOSEPH H. BARACH, M.D.,
OF PITTSBURG.

IN this preliminary communication, I desire to call attention to certain findings relative to the conduction of auscultatory sounds by the bony framework of the chest. In my perusal of the literature on the subject,[1] I find no positive references that the observations here noted have been previously made.

The first observation is, that typical bronchial breathing may be heard at the acromion end of the clavicle. By placing the bell of the stethoscope (a bell of about the size used on the Ford stethoscope) over the acromion end of the clavicle, and having the patient make deep respiratory efforts, typical bronchial breathing will be heard. When auscultating over a small clavicle, it will, at times, be necessary to draw the skin up around the bell to eliminate external sounds. Not only is bronchial breathing heard, but the spoken and whispered voice sounds are transmitted clearly.

These auscultatory findings are present in nearly all chests and are heard especially well in those persons who do not have a thick subcutaneous and fatty covering. In the normal individual they are usually heard with more distinctness on the right side than on the left; the reason for this will be referred to later.

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[1] Standard text-books by: Anders, Physical Diagnosis; Bonney, Pulmonary Tuberculosis and its Complications; Bulter, Diagnosis of Internal Medicine; Cabot, Physical Diagnosis; Da Costa, Physical Diagnosis; Guttman, Diagnosis; Greene, Medical Diagnosis; Leube-Salinger, Special Medical Diagnosis; Loomis, Physical Diagnosis; Musser, Medical Diagnosis; Sahli-Kinnicutt and Potter, Diagnostic Methods; Wilson, Diagnosis; and The Index Catalogue of the Surgeon General's Library and the Index Medicus from 1896 to 1910; many of the general articles on Physical Diagnosis, particularly those in American Journals.

From our knowledge of the anatomical relations, we know at once that beneath the acromion end of the clavicle, there is no pulmonary tissue; therefore, whence the sound? A moment's reflection makes it clear that the sound must be transmitted through the clavicle and by bone conduction. Evidently, the sounds created by the tracheal vibrations are taken up by the manubrium sterni and by the sternal ends of the clavicular articulation. The intensity of these sounds, as we hear them, is dependent primarily upon the proximity of the trachea to the upper portion of the anterior thoracic wall, then upon the sound condensing power of the underlying lung, and then upon the accuracy with which we can approximate the stethoscope to the clavicle (Fig. 1).

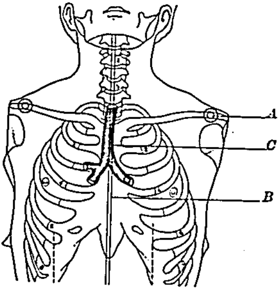

FIG. 1.—*A*, acromion area of bronchial breathing; *B*, median line of the body; *C*, position of the trachea as compared with the median line of the body. (J. C. Blake, AMER. JOUR. MED. SCI., 1899.)

Another observation by which we can easily demonstrate the simple truth of this sound-conducting property of bone to points distant from their origin is afforded by the upper cervical vertebræ and the bones of the cranium. From the illustrations given in text-books on physical diagnosis we are led to believe that the bronchial breathing on the back of the spinal column ends at about the sixth cervical vertebræ, at the level of the larynx. As a matter of fact, however, this sound is transmitted as high up along the spine as the stethoscope can be closely applied. Very often the bronchial sound is transmitted to, and may be distinctly heard by applying the stethoscope over the occipital and other bones of the cranium. It may also frequently be heard below the fifth dorsal vertebra which we have always been told is the lower boundary of bronchial breathing (Fig. 2).

These observations, then, prove conclusively that the bony framework of the chest is capable of transmitting auscultatory signs from points near their source of origin to distant points on the contour of the chest. We have in this fact a basic principle to consider in the interpretation of sounds heard over the various portions of the thorax, in health and in disease.

The application of the principle here involved will lead us toward the explanation of sounds hitherto not explained, and to the better explanation of certain sounds which supposedly were understood. Among those are the following:

Bronchovesicular Breathing, and Increased Vocal Fremitus and Resonance Over the Right Apex. A most admirable study of the origin of increased vocal fremitus and resonance over the right apex has been made by Fetterolf.[2] He summarizes the previous explanations of the causation of this into three views. (1) That it is the result of the more direct continuation of the right bronchus into the line of the trachea; (2) that there is a shorter distance from the bifurcation of the trachea to the right apex; and (3) that the right bronchus is of greater caliber. These three views he discards and in their place offers his own as based upon anatomical study. Fetterolf believes that the increased vocal fremitus and resonance of the right apex are due to the fact that on the right side the lung tissue proper comes in direct contact with the bronchus, whereas, on the left side there is about 3 cm. of other tissues interposed between

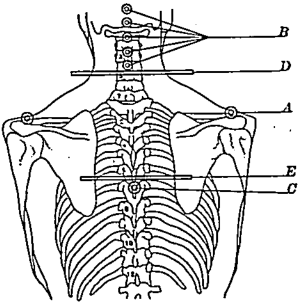

FIG. 2.—*A*, bronchial breathing heard over the acromion area; *B*, bronchial breathing heard above the recognized height; *C*, bronchial breathing heard below the recognized height; *D*, level of the fifth cervical vertebra where bronchial breathing is supposed to end; *E*, level of the fifth dorsal vertebra where the bronchial breathing is supposed to end.

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[2] The Anatomical Explanation of the Greater Amount of Vocal Fremitus and Vocal Resonance Normally Found at the Apex of the Right Lung, Arch. Int. Med., February, 1909.

the bronchus and lung tissue. The illustrations in his monograph show that the trachea is situated distinctly to the right of the median line.

By careful auscultation beginning at the manubrium sterni, I find that the tracheal tone or "bronchial breathing" extends further and is heard more clearly to the right than to the left of the median line. It is also true that the bronchial breathing heard over the acromion end of the right clavicle is better transmitted and is louder than that on the left side. The natural reason for this increased sound is the normal position of the trachea, which is almost entirely to the right of the median line.

Correlating the preceding facts, I may then offer the following explanation: The trachea, because of its proximity to the thoracic wall and lying to the right of the median line, imparts more sound vibrations to the right half of the upper part of the sternum, right clavicle, and first two ribs; these by their property of sound conduction transmit the "bronchial" element across that portion of the chest wall which covers the apex of the right lung. The sound emanating from the healthy lung apex is vesicular, while that transmitted by the bony framework is "bronchial." Heard together, they give rise to what has been designated as broncho-vesicular breathing. I believe this to be the predominating factor in the true explanation of the bronchial elements heard over the right apex. In round chests, in which the trachea is deep set and scarcely comes in direct contact with the anterior thoracic wall, the bronchial element in the breath sounds over the right apex, and the bronchial breathing at the acromion ends of the clavicles may be barely audible. A thick layer of subcutaneous tissue may also render these sounds quite imperceptible.

Bronchial Breathing without Dulness to Percussion. Especially in normal chests of slender adults and in children, we quite frequently hear distinct bronchial breathing at points a considerable distance from the previously recognized areas of normal bronchial breathing; that is, areas overlying the normal position of the trachea or bronchi. These are examples of transmitted bronchial breathing by bone conduction.

At the Acromion Area, I have found the sounds exaggerated when the apices were consolidated from pneumonia or tuberculosis. Moist tracheal rales, such as may be heard in any ordinary case of tracheo-bronchitis, or in pulmonary œdema, are distinctly transmitted to the acromion area, the clavicle acting merely as a conductor of the sound waves that are imparted to it.

There are, undoubtedly, a number of other instances of transmitted sound conduction by the bony framework of the chest, and some of these are under investigation now.

On considering the importance attached to bronchial breathing in both acute and chronic pulmonary diseases, one realizes how necessary is its proper interpretation as to its point of origin.

Other positive evidences of pulmonary consolidation must be present before we may say that the lung beneath the area of auscultation is more dense than normal.

The underlying principle involved in these observations is in complete harmony with the general law of physics: that the more dense the medium, the better conductor it is of sound waves.

A CLINICAL METHOD OF ESTIMATING THE COAGULATION TIME OF THE BLOOD.

By Robert Dawson Rudolf, M.D. (Edin.), F.R.C.P. (Lond.),
PROFESSOR OF THERAPEUTICS IN THE UNIVERSITY OF TORONTO; SENIOR ASSISTANT PHYSICIAN TO THE TORONTO GENERAL HOSPITAL, TORONTO, CANADA.

Many different methods have been employed for estimating the coagulability of the blood. In all these methods no attempt is or can, of course, be made actually to measure the time or extent of the coagulation of the blood when this is surrounded by normal tissues and is circulating in a normal manner, for under such circumstances it does not coagulate at all. The aim is always the testing of the coagulability of the blood under certain unnatural surroundings, and as these surroundings differ in different methods, the results obtained can only be compared in the most general way. Thus, by one method, healthy blood may coagulate in two minutes and by another in fifteen, and yet by each method the conclusion may be arrived at that the coagulation time is normal.

Among the various methods which have been advocated for the measuring of the coagulation time of the blood some, such as that of Brodie and Russell[1] and especially Addis' modification of it,[2] appear to give very constant results, but such apparatus is too complicated and elaborate for ordinary clinical use. Among the simpler clinical methods probably that of Wright has been used more widely than others, but in the hands of different observers has given very inconstant results. His method consists in filling several fine glass tubes with blood and keeping these at a temperature of 37° C. in a vessel of warm water, and then at intervals blowing out the contents of each tube until one is found to have coagulated. With this method coagulation occurs normally in about two minutes, and in abnormal conditions is said to occur in thirty seconds or even less. Many men find the method to give reliable results, but an objection which

[1] Jour. Phys., 1897, xxi, 403.

[2] Quar. Jour. Exper. Phys., 1908: i, 4; Brit. Med. Jour., 1908, i, 997.